A. INTRODUCTION

This chapter assesses the potential for impacts from construction activities in the project area anticipated in the future with the proposed action. Construction impacts, although temporary, can include noticeable and disruptive effects from a project that is associated with construction or that could induce construction. As stated in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, determination of the significance of construction impacts and the need for mitigation is generally based on the duration and magnitude of the impacts. Construction impacts are usually important when construction activity could affect traffic conditions, hazardous materials, archaeological resources, the integrity of historic resources, community noise patterns, and/or air quality conditions.

The proposed action consists of zoning map and text amendments and a Restrictive Declaration requiring the establishment of a 0.6-acre publicly-accessible open space as a condition for receiving a residential certificate of occupancy. The purpose of the proposed action is to facilitate a new predominantly residential mixed-use development on the two-block-project-area owned by the Applicant. The reasonable worst case development scenario (RWCDS) With-Action condition for the proposed action consists of approximately 1,147 dwelling units (DUs), of which approximately 344 DUs would be affordable housing DUs (30 percent of the total); 64,807 gross square feet (gsf) of local retail space; approximately 128,128 gsf of parking space, consisting of 427 spaces, as required by zoning; and approximately 26,000 sf of publicly-accessible open space. For RWCDS purposes it is assumed that project area, which is currently vacant and has no buildings and is used for temporary activities pursuant to short-term rental agreements, would be vacant in the future without the proposed action.

According to the *CEQR Technical Manual*, construction duration is often broken down into short-term (less than two years) and long-term (two or more years). Where the duration of construction is expected to be short-term, any impacts resulting from such short-term construction generally do not require detailed assessment. As described below, it is estimated that the project area buildings would be constructed in less than two years and would therefore be considered short-term. However, as construction activity associated with the RCWDS would occur in proximity to sensitive receptors, including two schools and a school playground, a preliminary assessment of potential construction impacts was prepared consistent with the guidelines of the *CEQR Technical Manual*, and is presented in this chapter.

Construction of the buildings projected under RWCDS, which for analysis purposes would be essentially the same as the Applicant's proposed development identified in Chapter 1, "Project Description," in terms of construction duration and intensity, is expected to take two years, with all buildings constructed concurrently in one phase. The RD would include a requirement that completion of the open space would be a condition for issuance of the first certificate of occupancy

(C of O) for residential use. As such, completion of all the project area buildings and the open space in a single phase is considered likely and is consistent with the Applicant's intentions for this site and construction of other developments.

This chapter of the EIS provides a preliminary impact assessment following the guidelines in the *CEQR Technical Manual*.

B. PRINCIPAL CONCLUSIONS

The proposed action/RWCDS would result in temporary disruptions including construction related traffic, dust, noise, or mobile source emissions. However, these effects would be temporary, as the duration of construction activities for the proposed development are not expected to exceed 24 months and construction activity generally would be limited to the hours of 7 AM to 6 PM on weekdays consistent with New York City construction regulations. The preliminary assessment provides a quarterly projection of average construction workers, construction worker vehicles, and construction trucks and provides preliminary assessments of the effects of project construction on transportation, air quality, noise, historic and cultural resources, hazardous materials and natural resources. As the duration of action-generated construction would not exceed 24 months, detailed analysis is not warranted and no significant adverse construction impacts would occur.

C. CONCEPTUAL CONSTRUCTION SCHEDULE AND ACTIVITIES

This chapter presents a description of the construction process for the purposes of quantification of environmental-effect causing activities only. It is not intended to describe the precise construction methods that may ultimately be used, nor is it intended to dictate or confine the construction process. Actual construction methods and materials may vary depending, in part, on how the construction contractors choose to implement their work to be most cost effective, within the requirements set forth in bid, contract, and construction documents. Construction specifications would require that construction contractors comply with all applicable legal requirements including environmental regulations and obtain necessary permits for the duration of construction. Construction of the RWCDS would follow applicable federal, state, and local laws for building and safety, as well as local noise ordinances, as appropriate.

Construction Sequencing

A construction schedule was developed by the applicant in consultation based on its experience with other projects and in consultation with its construction managers. The anticipated construction sequencing is presented in Figure 18-1a to Figure 18-1d, with discrete sequences provided for each building cluster. Although the development would consist of eight buildings, they would be grouped in four clusters, based on the site plan. These would include: (1) Building A, on the Northern Block west of the open space; (2) Buildings B and C, grouped together on the Northern Block east of the open space; (3) Buildings D and E, grouped together on the Southern Block east of the open space; and (4) Buildings F, G, and H, grouped together on the Southern Block west of the open space. As shown in the schedule, the construction duration of each building

Pfizer Sites

Building A Proposed Construction Schedule

Plan Duration

ACTIVITY

PERIOD

ACTIVITY	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19
Bid & Awards			■	■																			
Piles				■																			
Excavation & Foundation					■	■																	
Superstructure Concrete						■	■	■	■	■	■												
Plumbing					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Framing									■	■	■	■	■	■	■	■							
Misc Iron															■								
Fire Protection												■	■	■	■	■	■	■					
Electrical										■	■	■	■	■	■	■	■	■	■				
HVAC											■	■	■	■	■	■	■	■	■				
Masonry														■	■								
Windows														■	■								
Elevators														■	■	■	■	■					
Trash Chute																■							
Roofing																■							
Carpentry & Drywall																	■	■	■	■			
Flooring																			■	■			
Taping & Painting																			■	■	■		
Stone & Tile																				■			
FF & E																						■	
Landscaping																						■	
Sitework																					■	■	
TCO																					■	■	
Punchlist																						■	

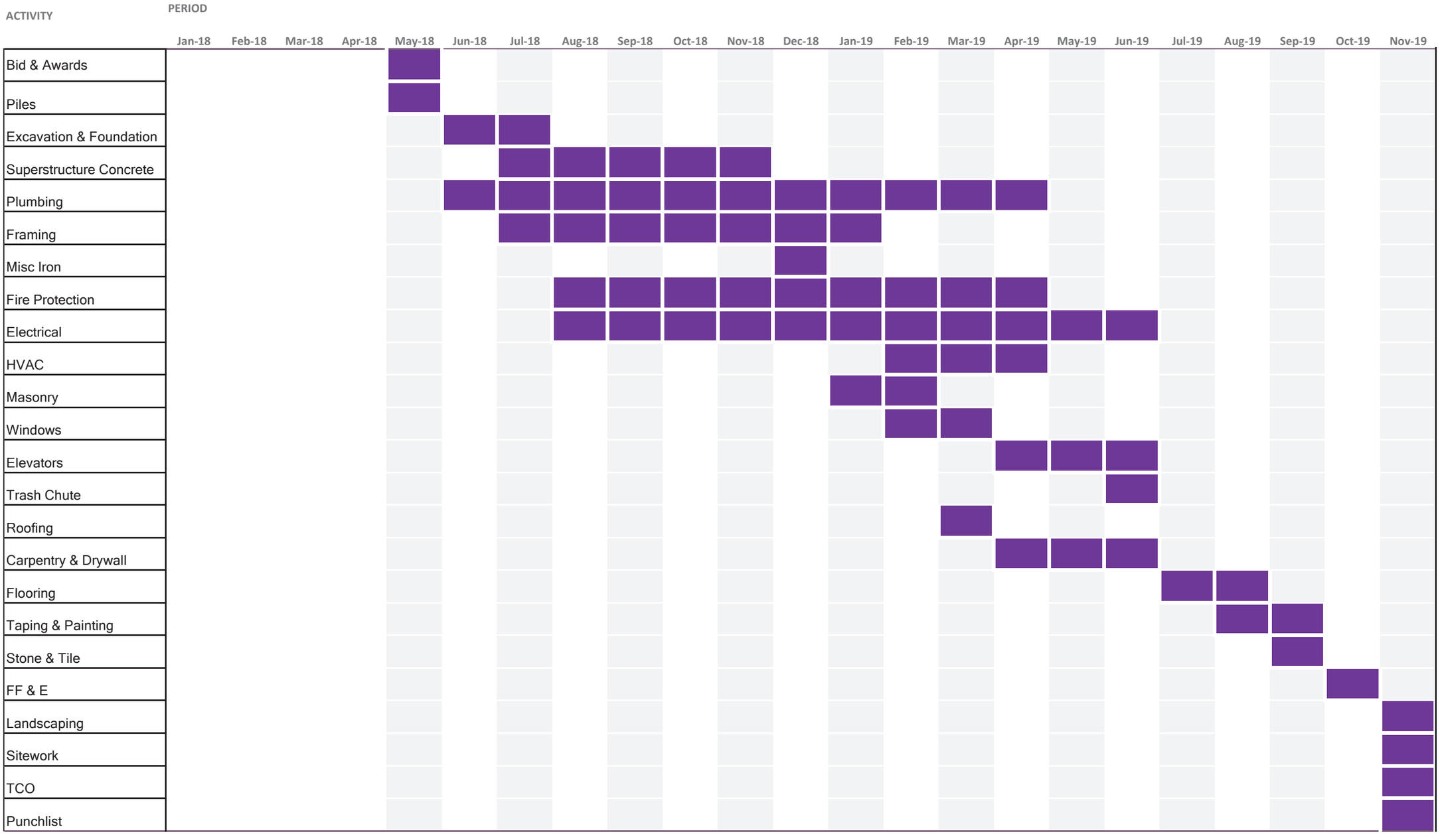
Pfizer Sites

Buidings B & C Proposed Construction Schedule

Plan Duration

ACTIVITY

PERIOD



Pfizer Sites

Buidings D & E Proposed Construction Schedule

Plan Duration

ACTIVITY

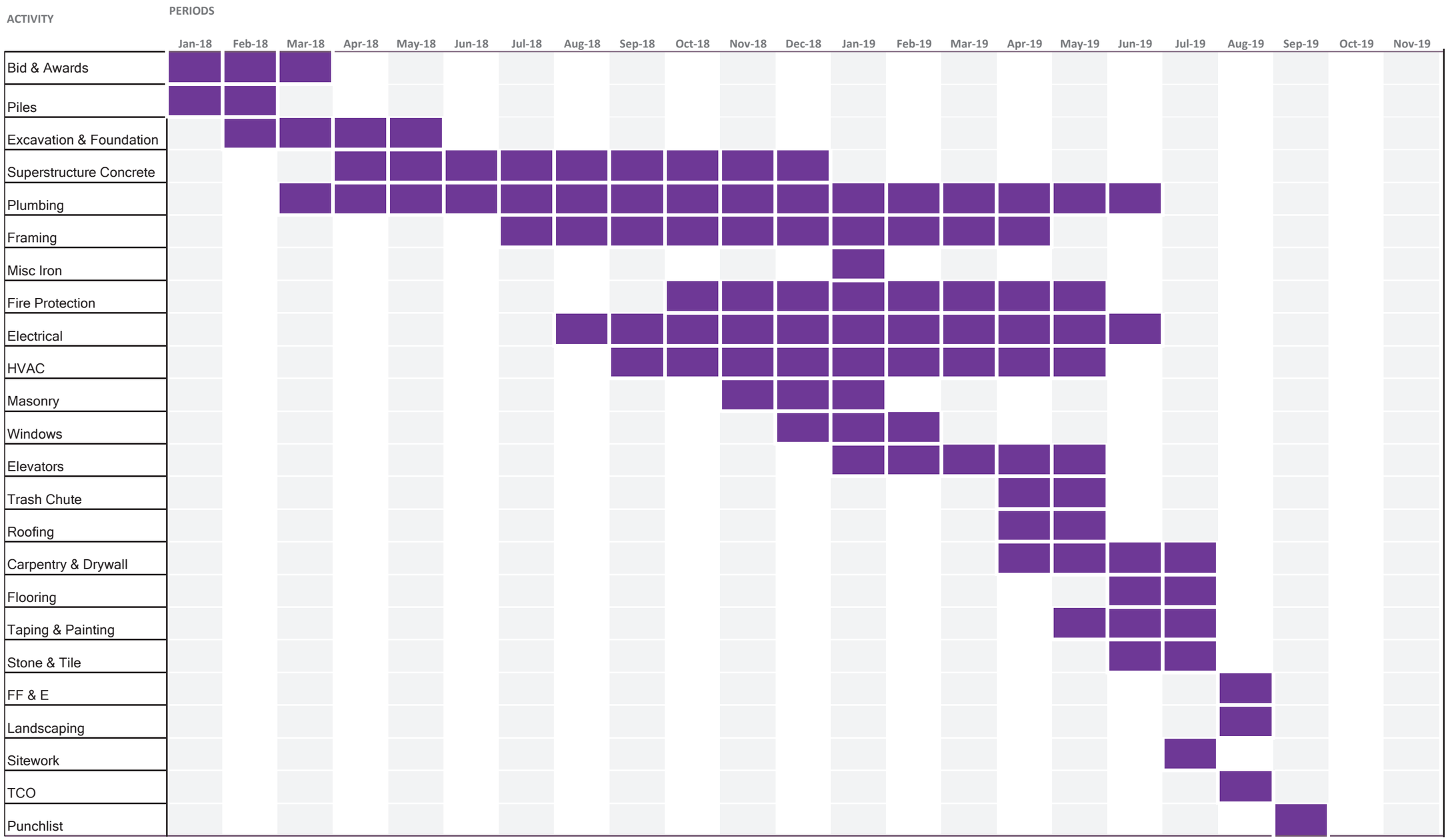
PERIODS

ACTIVITY	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19
Bid & Awards					■	■																	
Piles						■																	
Excavation & Foundation						■	■																
Superstructure Concrete							■	■	■	■	■												
Plumbing							■	■	■	■	■	■	■	■	■	■							
Framing								■	■	■	■	■	■										
Misc Iron												■											
Fire Protection								■	■	■	■	■	■	■	■	■							
Electrical									■	■	■	■	■	■	■	■	■	■					
HVAC														■	■	■	■						
Masonry														■	■								
Windows														■	■	■							
Elevators																■	■	■					
Trash Chute															■								
Roofing															■								
Carpentry & Drywall																■	■	■	■				
Flooring																				■			
Taping & Painting																					■	■	
Stone & Tile																				■	■		
FF & E																							■
Landscaping																							■
Sitework																							■
TCO																							■
Punchlist																							■

Pfizer Sites

Buildings F, G, and H Proposed Construction Schedule

Plan Duration



cluster would be 19 to 21 months. The construction of these four building clusters would be carried out concurrently, with separate management teams for each. As shown in Figure 18-1 starting and ending dates for the four buildings clusters would be staggered, with an overall duration of 23 months, with the last month consisting solely of tasks involving less intensive effects on the surrounding area including furniture, fixtures, and equipment (FF&E) and outdoor work. As such, with a construction schedule of less than two years, the It should be noted that the RD recorded against the project area would require that the publicly-accessible open space would be completed before temporary certificates of occupancy (TCOs) for residential use may be issued for the project area buildings. As project construction for all four building clusters would conclude within a 3-month period and any remaining construction activity occurring as residents begin to occupy the development would be low intensity work such as landscaping there would not be a potential for project construction to result in on-site impacts on new residents.

Construction Activities

Overview

Construction of mid-rise or large-scale buildings in New York City typically follows a general pattern. The first task is construction startup, which involves the siting of work trailers, the installation of temporary power and communication lines, and the erection of site perimeter fencing. As the project area does not contain any existing buildings, this project would not require any building demolition. For sites requiring new or upgraded public utility connections, these activities are undertaken next (e.g., electrical connection, installation of new water or sewer lines and hook-ups, etc.). Excavation and removal and/or addition and re-grading of the soils is the next step, followed by construction of the foundation. When the below-grade construction is completed, construction of the core and shell of the new building begins. The core is the central part of the building and is the main part of the structural system. It contains the elevators and the mechanical systems for heating, ventilation, and air conditioning (HVAC). The shell is the outside of the building. As the core and floor decks of the building are being erected, installation of the mechanical and electrical internal networks would start. As the building progresses upward, the exterior cladding is placed, and the interior fit-out begins. During the busiest time of building construction, the upper core and structure are built while the mechanical/electrical connections, exterior cladding, and interior finishing progress on lower floors. Finally, site work, including outdoor components, is undertaken, and site access and protection measures required during construction are removed.

General Construction Practices

Governmental Coordination and Oversight

The governmental oversight of construction in New York City is extensive and involves a number of City, state, and federal agencies. Table 18-1 shows the main agencies involved in construction oversight and each agency's areas of responsibility; as this is a generic list some of the items listed would not be applicable to the RWCDS given the characteristics of the project area and the proposed action. The primary responsibilities lie with New York City agencies. The New York City Department of Buildings (DOB) has the primary responsibility for ensuring that the

construction meets the requirements of the New York City Building Code and that buildings are structurally, electrically, and mechanically safe. In addition, DOB enforces safety regulations to protect both construction workers and the public. The areas of responsibility include the enforcement of regulations pertaining to the installation and operation of construction equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding. The New York City Department of Environmental Protection (DEP) enforces the New York City Noise Control Code (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113) and the DEP Notice of Adoption Rules for Citywide Construction Noise Mitigation (also known as Chapter 28), regulates water disposal into the sewer system, oversees dust control for construction activities, and, in instances when there is not a hazardous materials (E) designation assigned to the site, approves Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs). Alternately, if a hazardous materials (E) designation is assigned to a site (which, as discussed in further detail below, would be the case for the project area should the proposed action be approved), the New York City Office of Environmental Remediation (OER) approves RAPs and CHASPs. The New York City Fire Department (FDNY) has primary oversight for compliance with the New York City Fire Code and for the installation of tanks containing flammable materials. DOT reviews and approves any traffic lane and sidewalk closures. The New York City Landmarks Preservation Commission (LPC) approves studies and testing to prevent loss of archaeological materials and to prevent damage to fragile historic structures. New York City Transit (NYCT) is in charge of bus stop relocations (along with DOT) and any subsurface construction within 200 feet of a subway structure (see discussion below).

On the state level, the New York State Department of Environmental Conservation (NYSDEC) regulates discharge of water into rivers and streams, disposal of hazardous materials, and construction, operation, and removal of bulk petroleum and chemical storage tanks. The New York State Department of Labor (NYSDOL) licenses asbestos workers. On the federal level, the U.S. Environmental Protection Agency (EPA) has wide ranging authority over environmental matters, including air emissions, noise emission standards, hazardous materials, and the use of poisons. Much of the responsibility is delegated to the state level. The U.S. Occupational Safety and Health Administration (OSHA) sets standards for work site safety.

Hazardous Materials Remediation

As detailed in Chapter 9, "Hazardous Materials," to ensure that the proposed action would not result in significant, adverse hazardous materials impacts, (E) designations would be mapped on the project area, including the Southern Block which is currently subject to a Voluntary Cleanup Agreement (VCA) requiring DEC oversight and approval of site work before residential uses can be developed. As discussed in Chapter 9, an (E) designated site is an area designated on a zoning map within which no change of use or development requiring a DOB permit may be issued without approval of OER. These sites require the OER's review to ensure protection of human health and the environment from any known or suspected hazardous materials associated with the site. As described in Chapter 9, the (E) designation ensures that the fee owner conduct a testing and sampling protocol and remediation, where appropriate, to the satisfaction of the OER before the issuance of a permit by DOB. The environmental requirements for the (E) designation also include mandatory construction-related health and safety plan, which must also be approved by the OER.

Transit Infrastructure

The project area is located immediately adjacent to the NYCT infrastructure including the Flushing Avenue subway station, the adjoining tunnel of the G crosstown line, and a street stair providing access to the station that would be located close to Building H. Therefore, before a construction permit for excavation or construction involving in-ground disturbance for the project area can be issued by the DOB, NYCT's Outside Projects office must issue an approval for construction activities. Through this approval process, NYCT requires the applicant to demonstrate that there would not be a negative effect on its facilities, either during construction or afterward. The nature of this review process depends on the characteristics of both the transit facilities in question and the scope of construction being proposed. Typically, this includes the submission of drawings indicating areas of excavation and construction and a description of construction activities such as bracing of subway station walls and pile driving that could have the potential to result in vibrations. For this project specifically, this would provide a process for resolving any concerns that may arise regarding the placement of building access points in relation with the existing subway street located adjacent to the Southern Block in order to avoid conflicts with subway access.

Deliveries and Access

During construction, access to the project area would be controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Security guards and flaggers would be posted, as necessary. After work hours, the gates would be closed and locked. Security guards may patrol the site after work hours and over the weekends to prevent unauthorized access.

Material deliveries to the site would be controlled and scheduled. Unscheduled or haphazard deliveries would be minimized. To aid in adhering to the delivery schedules, as is normal for building construction in New York City, flaggers would be employed at each of the gates. The flaggers could be supplied by the sub-contractor on-site at the time or by the construction manager. The flaggers would control trucks entering and exiting the site so that they would not interfere with one another. In addition, they would provide a traffic aid as the trucks enter and exit the on-street traffic streams.

Hours of Work

Construction activities for buildings in the City generally take place Monday through Friday, with exceptions that are discussed separately below. In accordance with City laws and regulations, construction work at the project site would generally begin at 7 AM on weekdays, with workers arriving to prepare work areas between 6 and 7 AM. Construction work activities would typically finish around 3:30 PM, but on some occasions, the workday could be extended, depending upon the need to complete some specific tasks beyond normal work hours, such as completing the drilling of piles, finishing a concrete pour for a floor deck, or completing the bolting of a steel frame erected that day. The extended workday would generally last until about 6 PM and would not include all construction workers on-site, but just those involved in the specific tasks requiring additional work time.

Table 18-1, Construction Oversight in New York City

Agency	Area(s) of Responsibility
New York City	
Department of Buildings (DOB)	Primary oversight for Building Code and site safety
Department of Environmental Protection (DEP)	Noise, hazardous materials, dewatering, dust
Office of Environmental Remediation (OER)	Hazardous materials
Fire Department (FDNY)	Compliance with Fire Code, tank operation
Department of Transportation (DOT)	Traffic lane and sidewalk closures; bus stop relocation
New York City Transit (NYCT)	Bus stop relocation; any subsurface construction within 200 feet of a subway
Landmarks Preservation Commission (LPC)	Archaeological and historic architectural protection
New York State	
Department of Labor (DOL)	Asbestos workers
Department of Environmental Conservation (NYSDEC)[1]	Dewatering, hazardous materials, tanks, Stormwater Pollution Prevention Plan, Industrial SPDES, if any discharge into the Hudson River
United States	
Environmental Protection Agency (EPA)	Air emissions, noise, hazardous materials, toxic substances
Occupational Safety and Health Administration (OSHA)	Worker safety

[1] As discussed in Chapter 9, "Hazardous Materials," the Southern Block (Block 2265, Lot 14) is subject to a Voluntary Cleanup Agreement under the jurisdiction of (NYSDEC), as memorialized in a deed restriction on the property.

Occasionally, Saturday or overtime hours may be required to complete some time-sensitive tasks. Weekend work requires a permit from the DOB and, in certain instances, approval of a noise mitigation plan from DEP under the City's Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1st, 2007, limits construction (absent special circumstances, as described below) to weekdays between the hours of 7 AM and 6 PM and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM or on weekends) may be permitted only to accommodate: (i) emergency conditions; (ii) public safety; (iii) construction projects by or on behalf of City agencies; (iv) construction activities with minimal noise impacts; and (v) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. In such cases, the number of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. The typical weekend workday would be on Saturday from 7 AM with worker arrival and site preparation to 5 PM for site cleanup.

Construction Staging Areas and Sidewalk and Lane Closures

Construction staging areas, also referred to as "laydown areas," are sites that would be used for the storage of materials and equipment and other construction-related activities. Work zones are those areas where the construction is occurring. Staging areas would typically be fenced and lit for security and would adhere to New York City Building Codes.

It is anticipated that construction staging would most likely occur on the project area itself and may, in some cases, extend within the curb and travel lanes and sidewalks of public streets adjacent to the site. As is typical with construction projects in New York City, it is anticipated that some sidewalks immediately adjacent to project area would be closed to accommodate heavy loading areas for at least several months of the construction period and that portions of adjacent roadways may need to be temporarily closed during certain limited periods of construction. Pedestrians would either use a temporary walkway in a sectioned-off portion of the street or be diverted to walk on the opposite side of the street. The developer would be required to demonstrate how it intends to reduce disruptions due to vehicle deliveries and staging and the closures of adjacent sidewalks and public streets, which would be reviewed and approved by DOT. In addition, detailed MPT plans for any temporary sidewalk and lane closures would be submitted for approval to the DOT OCMC, the entity that insures critical arteries are not interrupted, especially in peak travel periods. Builders would be required to plan and carry out noise and dust control measures during construction.

Appropriate protective measures for ensuring pedestrian safety surrounding the project site would be implemented under these plans. Construction activities would also be subject to compliance with the New York City Noise Code and by the EPA noise emission standards for construction equipment. In addition, there would be requirements for street crossing and entrance barriers, protective scaffolding, and compliance with applicable construction safety measures.

General Construction Tasks

Construction Startup Tasks

The following tasks are considered to be typical startup work to prepare for site construction. Construction startup work prepares a site for the construction work and would involve the installation of public safety measures, such as fencing, sidewalk sheds, and Jersey barriers. The construction site would be fenced off, typically with solid fencing to minimize interference between the persons passing by the site and the construction work. Gates for workers and for trucks would be installed, and sidewalk sheds and Jersey barriers would be erected. Trailers for the construction engineers and managers would be hauled to the site and installed. Also, portable toilets, dumpsters for trash, and water and fuel tankers would be brought to the site and installed. Temporary utilities would be connected to the construction trailers. During the startup period, permanent utility connections may be made, especially if the construction manager has obtained

early electric power for construction use, but utility connections may be made at almost any time during the construction sequence.

Excavation and Foundation

First, piles would be installed along the perimeter of the construction site to hold back soil around the excavation area. Next, excavators would be used for the task digging the building foundations. Any excavated soil to be removed from the project site would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse elsewhere in the project area or on another construction site. This stage of construction would also include construction of the foundation. To reduce the potential for public exposure to contaminants during excavation activities, construction activities would be performed in accordance with all applicable regulatory requirements. Specifically, all construction subsurface soil disturbances would be performed in accordance with RAPs and CHASPs approved by OER as required under the (E) designations that would be mapped on both project area blocks and in consultation with and approval by DEC pursuant to the Voluntary Cleanup Agreement (VCA) binding on the Southern Block.

Superstructure and Exterior Fit-out

Construction of the buildings' cores would include construction of the buildings' frameworks (installation of beams and columns) and floor decks; elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment; core stairs; and restroom areas. Exterior construction involves the installation of the facade (exterior walls, windows, and cladding and the roof). Temporary construction elevators (hoists) would be constructed for the delivery of materials and vertical movement of workers, when necessary.

Interior Fit-out and Finishing

These stages would include the construction of interior partitions, installation of lighting fixtures, amenity construction, interior finishes (floor, painting, millwork, glass and glazing, door and hardware, etc.), mechanical and electrical work (such as the installation of elevators), and plumbing and fire protections fit-out work. These stages of construction are typically the quietest, as most of the construction activities would occur within the buildings with the facades substantially complete.

Site Work

This stage would include the completion of the 26,000-sf publicly-accessible open space. Misting would be used to mitigate dust.

Estimate of Construction Workers and Construction Period Trucks

Worker and truck projections were projected based on representative buildings of similar sizes and uses from prior EIS documents and information for similar known construction projects in the City. The resultant estimate of the number of trucks and workers per quarter are summarized in Table 18-2. As indicated in the table, throughout the 23-month construction period, the number of

daily construction workers would average 446, the number of daily construction worker vehicles would average 82, and the number of daily construction trucks would average 45. The peak period for workers and worker vehicles would be the 4th quarter of 2019, with 804 workers and 147 worker vehicles, and the peak period for construction trucks and overall vehicle trips (measured in passenger-car-equivalents) would be the 3rd quarter of 2019 during a period of superstructure, exterior fit-out, and interior fit-out tasks, with 91 construction trucks and 310 total vehicles (passenger-car-equivalents).

Table 18-2, Estimated Total Number of Construction Workers, Construction Worker Vehicles, and Construction Trucks On-site Per Day

Year	2018				2019				Project Total	
Quarter[1]	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*Peak*	*Average*
Construction Workers[2]	41	233	697	804	710	525	390	171	804	446
Construction Worker Vehicles[3]	8	43	128	147	130	96	71	31	147	82
Construction Trucks[2]	12	54	91	78	56	24	23	23	91	45
Total Construction Vehicles (Worker Vehicles + Trucks) in PCEs[4]	33	150	310	303	242	145	117	54	310	169

Notes:
[1] Represents the monthly average for each quarter.
[2] Construction worker and truck estimates based on average worker and truck estimates utilized in 2013 Halletts Point EIS for mixed-use buildings of similar size to the RWCDS buildings.
[3] Based on 2000 Census reverse-journey-to-work data for employees in the construction industry (Brooklyn census tracts 237, 239, 255, 257, 259.02, 285.01, 491, 507, 509, 511, 529, 531, 533; 237 & 239 now consolidated into 1237.)
[4] To calculate total daily vehicles in PCEs, each truck trips has a PCE of 2.0.
Yellow highlighting denotes peak periods.

D. PRELIMINARY ASSESSMENT

In accordance with the guidelines of the *CEQR Technical Manual*, this preliminary assessment evaluates the effects associated with the proposed action's construction related activities including transportation, air quality, noise, historic and cultural resources, hazardous materials, and natural resources.

Transportation

The proposed action would result in mixed-use development in newly constructed buildings in the project area, constructed in less than two years. During the construction period, the project area would generate trips by workers traveling to/from the area, as well as trips associated with the movement of materials and equipment. Given typical construction hours, worker trips would be concentrated in off-peak hours and would not represent a substantial increment during the area's peak travel periods.

Construction Traffic

As discussed above, average daily construction worker and truck activities were forecast for the project's construction period. For a conservative reasonable worst-case analysis of potential construction traffic impacts, the peak levels of construction in each calendar quarter were used as the basis for estimating peak hour construction traffic volumes. The proposed construction schedule assumes peak construction activities would occur in the third and fourth quarter of 2018. As shown in Table 18-2 above, during peak construction months, the daily averages of peak construction worker and truck traffic were estimated at 310 passenger-car-equivalent (PCE) vehicles per day in the third quarter of 2018. These volumes represent peak days of work, and some days during the construction period would have fewer construction workers and trucks on-site.

Peak Construction Worker Travel Demand and Truck Trips in 2016

Based on reverse-journey-to-work Census data for this area, it is anticipated that construction workers' travel to and from projected development sites would be primarily by public transportation or walk/bicycle (approximately 71 percent) with a lesser percentage by private autos (approximately 31 percent) at an average occupancy of approximately 1.6 persons per auto. It is also estimated that 80 percent of all workers would arrive and depart in the 60-minute period before and after each shift.

The construction schedule assumes that all site activities would take place during the typical construction shift of 7:00 AM to 3:30 PM. Construction truck trips would occur throughout the day (with higher numbers of trips during the early morning), and trucks would remain in the area for relatively short durations. Construction worker travel would typically take place during the hours before and after the work shift.

Table 18-3 shows construction worker auto and construction truck trips (PCEs) during the peak construction period. The estimated daily vehicle trips were distributed to various hours of the day based on typical work shift allocations and conventional arrival/departure patterns of construction workers and trucks. For construction workers, as noted above, the substantial majority (80 percent) of the arrival and departure trips are expected to take place during the hour before and after each shift. For construction trucks, deliveries would occur throughout the time period while the construction site is active. However, to avoid traffic congestion and ensure that materials are on-site for the start of each shift, construction truck deliveries would typically include an early concentration during the hour before the regular day shift (25 percent of shift total), overlapping with construction worker arrival traffic. Based on these assumptions, the peak hour construction traffic was estimated for the daily construction period. The total vehicle trips per hour are PCE values, which are based on one PCE per auto and two PCEs per truck.

Table 18-3, Q3 2018 Peak Construction Vehicle Trip Projections

Hour	Auto Trips (1)			Truck Trips (PCEs) (2)			Total Vehicle Trips		
	In	Out	Total	In	Out	Total	In	Out	Total
6 AM – 7 AM	102	0	102	46	46	92	148	46	194
7 AM – 8 AM	26	0	26	18	18	36	44	18	62
8 AM - 9 AM	0	0	0	18	18	36	18	18	36
9 AM – 10 AM	0	0	0	18	18	36	18	18	36
10 AM–11 AM	0	0	0	18	18	36	18	18	36
11 AM – 12 PM	0	0	0	18	18	36	18	18	36
12 PM–1 PM	0	0	0	18	18	36	18	18	36
1 PM – 2 PM	0	0	0	9	9	18	9	9	18
2 PM – 3 PM	0	6	6	9	9	18	9	15	24
3 PM – 4 PM	0	102	102	5	5	10	5	107	112
4 PM – 5 PM	0	20	20	5	5	10	5	25	30
5 PM – 6 PM	0	0	0	0	0	0	0	0	0

Notes:
(1) Construction auto trips were based on a peak of 764 daily workers. A 31 percent auto share was assumed for construction workers, at an average occupancy of approximately 1.6 persons per auto. It is assumed that 80 percent of construction worker arrival and departure trips would take place during the hour before and after each shift.
(2) Construction truck trips were based on a peak of 91 daily trucks. Twenty-five percent of daily trucks were conservatively assumed to arrive in the hour before the start of each shift, 5 percent in the last hour of the shift, and 10 percent in each of the remaining hours during the work day. For analysis purposes, each truck delivery was assumed to result in two truck trips (four PCE trips) during the same hour.
(3) PCEs calculated at 1.0 PCE per worker auto and 2.0 per construction truck.

As shown in Table 18-3, in the third quarter of 2018, approximately 194 PCEs would arrive in the 6 AM to 7 AM arrival hour for construction-related activity, while 36 PCEs would arrive in the 8 AM to 9 AM morning peak travel hour for the study area. In the afternoon, approximately 112 PCEs would be generated by the project area in the 3 PM to 4 PM hour, while 0 PCEs would be generated during the 5 PM to 6 PM peak travel hour for the study area. As such, the action-generated construction vehicle trips would not exceed the *CEQR Technical Manual* analysis threshold of 50 PCEs during the study area peak travel hours. While the construction vehicle trips would exceed the threshold in the 6 AM to 7 AM and 3 to 4 PM peak hours, the construction morning peak would occur when study area volumes are substantially lower and the construction morning and afternoon peak would be lower than the proposed action's operational incremental peak travel demand during the peak travel hours for the study area. Furthermore, this peak construction demand would be of limited duration, during the busiest phase of project construction with the overall construction period lasting less than two years and therefore considered short-term and not significant for CEQR purposes. Accordingly, a detailed construction traffic analysis is therefore not warranted, as traffic conditions with the action-generated construction vehicles would not be expected to result in any significant adverse impacts over and above those identified in Chapter 12, "Transportation" for operation of the proposed action.

Street Lane and Sidewalk Closures

The two-block project area encompasses eight street frontages. As discussed above, there could be various curb lane and/or sidewalk closures associated with construction activities at these sites. These activities would include the unloading of construction materials from trucks and the loading of trucks with construction debris. Truck movements would be spread throughout the day and would generally occur between the hours of 6:00 AM and 3:00 PM, depending on the stage of construction. Flaggers are expected to be present during construction to manage the access and movements of trucks. Little if any rerouting of traffic is anticipated, and moving lanes of traffic

are expected to be available at all times along the affected streets. It is possible that some sidewalks immediately adjacent to the project area under construction would also be closed to accommodate heavy loading areas for portions of the construction period, however, the ability to use portions of the project area as construction staging areas including the future publicly-accessible open space may enable the project to limit such closures. Pedestrians would either walk on the opposite side of the street or in a sectioned-off portion of the street. Detailed Maintenance and Protection of Traffic (MPT) Plans would be submitted for approval to NYCDOT's Office of Construction Mitigation and Coordination (OCMC). Appropriate protective measures for ensuring pedestrian safety surrounding the project area would be implemented under these plans.

Transit and Pedestrians Screening

As previously shown Table 18-2, in the fourth quarter of 2018, approximately 804 construction workers would travel to and from project area. Based on Census data cited above approximately 71 percent of construction workers would travel to and from the project area via transit or walk/bicycle. Few if any of these workers would use transit or travel on foot during the AM and PM commuting peak hours when transit ridership is at its highest, with all workers expected to arrive by 8 AM and all workers expected to depart before 5 PM. As such, the proposed action would not have the potential to result in significant adverse construction transit impacts and no further transit assessment is warranted. As also discussed above, construction of the proposed action would require review and approval by NYCT, Outside Projects office, a process that would address the effects of project construction on access to the neighboring Flushing Avenue subway station.

As noted in Chapter 12, "Transportation," pedestrian volumes are generally low in the project area vicinity, with all analyzed locations operating at level of service (LOS) B or better, indicating good operating conditions. Most construction worker pedestrian trips would occur outside the study area pedestrian peak hours, when pedestrian operations are similarly good. Accordingly, the proposed action would not have the potential to result in significant adverse construction pedestrian level of service impacts and no further assessment is warranted.

Air Quality

Emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust generating activities, have the potential to affect air quality. In general, much of the heavy equipment used in construction has diesel-powered engines and produces relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM). Gasoline engines produce relatively high levels of carbon monoxide (CO). Fugitive dust generated by construction activities is composed of particulate matter. As a result, the primary air pollutants of concern for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}) and less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO.

The *CEQR Technical Manual* lists several factors for consideration in determining whether a detailed quantified on-site and/or off-site construction impact assessment for air quality is appropriate. For on-site assessment, these factors include: (1) the duration of any heavy construction activity; (2) the type of construction activity; (3) the physical relationship of the

project site to nearby sensitive receptors (i.e., residences and schools); (4) the use of emission controls measures such as the nature and extent of possible use of Best Available Technology (BAT) for construction equipment. All of these factors have been taken into consideration in the construction air quality preliminary assessment undertaken for the proposed action, which, as detailed in the following sections, concludes that a quantified analysis of on-site construction activities is not warranted, and the proposed action would not result in significant adverse construction-period air quality impacts.

1. The Duration of Any Heavy Construction Activity

The *CEQR Technical Manual* does not define "short-term" for air quality assessments, but it has generally been accepted that the term refers to a period of two years or less. The construction period for the proposed action would be under two years in duration with completion in late 2019. In addition, the most intense construction activities in terms of air pollutant emissions (demolition, excavation and foundation work where a number of large non-road diesel engines would be employed) are only expected to take up to approximately three to five months per building cluster and have a cumulative duration of seven months. Although superstructure construction, exterior construction, and interior fit-outs would continue after demolition, excavation, and foundation work is complete, those efforts would result in much less emissions since heavy duty diesel equipment such as excavators, backhoes, and pile drivers associated with demolition, excavation, and foundation work would no longer be needed on-site. The equipment that would be operating in these later tasks would mostly be small in engine size and/or dispersed vertically throughout the building, resulting in very low concentration increments in adjacent areas.

2. The Type of Construction Activity

The typical construction of a development site, as mentioned above and as reflected in the project construction schedule, consists of three main phases or types of construction. The first type of construction would be excavation and foundation (as the project area contains no existing buildings there would be no building demolition). The second type of construction would be the building or outfitting of the superstructure or skeleton of the building. The last type of would be the exterior construction and interior fit-outs of the building, which include several tasks identified in the Figure 18-1. As discussed above, the project would consist of four distinct building clusters distributed across the two project area blocks and separated by the midblock publicly-accessible open space that would be provided as part of the project. During construction, a handful of large non-road diesel engines would operate throughout the project area. These engines would generally move around each building cluster, although it is expected that a concrete pump would be located in one location during concrete pours.

3. The Physical Relationship of the Project Site to Nearby Sensitive Receptors

The project area contains no buildings and currently contains only short-term vehicle/equipment storage uses which would be removed when construction begins. There are nearby sensitive receptor typical of a densely developed urban environment in including two schools, a school playground, and residences located across the street from the project area. As such, construction activity, including fuel-powered construction equipment and vehicles would potentially occur near

these sensitive receptor locations. However, as noted above, the construction would have an overall duration of less than two years and the most intense construction activities in terms of air pollutant emissions (excavation and foundation work where a number of large non-road diesel engines would be employed) are only expected to take up to approximately three to five months for each building cluster and for a total duration of seven months overall across the two-block project area. Moreover, the nearby sensitive receptor locations are located across the street rather than on immediate bounding properties. Such distance between the emissions sources and these sensitive locations would result in enhanced dispersion of pollutants and, therefore, potential concentration increments from on-site sources at such locations would be reduced. Given the size of the project area and the ability to use the future publicly-accessible open space for construction staging, large emissions sources and activities such as concrete trucks and pumps would be located away from residential buildings, schools, and publicly accessible open spaces, including the Beginning With Children School's playground, to the extent practicable and feasible.

Although ending period of construction for the four building clusters would vary by a few months, given the short time period and the requirement to complete the on-site publicly-accessible open space before a residential TCO can be issued, it is unlikely that any action-generated building would be occupied adjacent to ongoing construction. Therefore there would be no overlap of construction adjacent to new sensitive receptors. Moreover, as indicated in Figure 18-1 and discussed above, the heaviest construction activities would last for a period of approximately three to five months for building cluster and would have an overall duration of seven months, and would therefore not affect any nearby sensitive receptors for an extended period of time.

4. Use of Emission Control Measures

Depending on the phase of construction, different types of construction equipment are necessary. The heaviest construction equipment would be used during the excavation and foundation phase. To ensure that the construction resulting from the proposed action would minimize diesel particulate matter (DPM) emissions, the project would implement an emissions reduction program for all construction activities to the extent practicable, including:

- *Clean Fuel.* Ultra-low sulfur diesel (ULSD) would be used exclusively for all diesel engines throughout the construction sites as mandated by NYC law.
- *Source Location.* In order to reduce the resulting concentration increments, large emissions sources and activities such as concrete trucks and pumps would be located away from residential buildings, academic locations, and publicly accessible open spaces, including the Beginning With Children School's playground, to the extent practicable and feasible.
- *Dust Control.* Strict fugitive dust control plans would also be a part of a possible construction program. For example, stabilized truck exit areas would be established for washing off the wheels of trucks that exit the construction site. Truck routes within a site would be either watered as needed to avoid the re-suspension of dust. All trucks hauling loose material would be equipped with tight fitting tailgates and their loads securely covered prior to leaving the sites. In addition to regular cleaning by the City, streets adjacent to the sites would be cleaned as frequently as needed. Chutes would be used for material drops during demolition. Water sprays would be used for all excavation, demolition, and transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. In addition,

all necessary measures would be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed.

- *Idle Restriction.* In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time would also be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine

Overall, the proposed emission reduction program is expected to significantly reduce DPM emissions and their effects on sensitive receptors. Accordingly, a detailed qualitative rather than quantitative air quality analysis was provided to assess the potential impacts of on-site construction activities.

Fugitive Dust Impacts

Fugitive dust emissions from land clearing operations can occur from excavation, hauling, dumping, spreading, grading, compaction, wind erosion, and traffic over unpaved areas. Actual quantities of emissions depend on the extent and nature of clearing operations, the type of equipment employed, the physical characteristics of underlying soil, the speed at which construction vehicles are operated, and the type of fugitive dust control methods employed. Much of the fugitive dust generated by construction activities generally consists of relatively large-size particles (greater than 100 microns in diameter), which are expected to settle within a short distance (within 20 to 30 feet) from the construction site and to not significantly impact nearby buildings or people. As detailed above, all appropriate fugitive dust control measures—including watering of exposed areas and dust covers for trucks—would be employed during construction of each projected and potential development site to minimize the impacts of fugitive dust emissions. As a result, no significant air quality impacts from fugitive dust emissions would be anticipated during construction.

Diesel Emission Impacts

Emissions from the heavy-duty diesel-fueled construction equipment can also occur from excavation, hauling, dumping, spreading, grading, and compaction. Actual quantities of these emissions depend on the extent and nature of clearing operations, the type of equipment employed, the speed at which construction vehicles are operated, and the type of emission controlled methods employed. These emissions could impact existing land uses.

Action-generated construction would be accomplished using all appropriate emission control measures, including the use of ultra-low sulfur fuel oil, source location restriction, and engine idling restrictions. In addition, these excavation, hauling, dumping, spreading, grading, and compaction activities would generally occur for five months of less for each building cluster. As a result, no significant air quality impacts emissions would be anticipated from these emissions.

Mobile Source Impacts

Mobile source emissions typically result from the operation of construction equipment, trucks delivering materials and removing debris, workers' private vehicles, or occasional disruptions in traffic near the construction site. These emissions, however, would be released from vehicles traveling on multiple roadways providing access to the project area. In general, the development sites are spread out sufficiently within the study area so as not to cause significant air quality impacts.

It is estimated that construction vehicle volumes during the surrounding area peak hours would consist of 18 trucks (9 in, 9 out) traveling to the project area. These values, which would occur during the quarter (3-month period) of peak vehicle trips are less than the applicable *CEQR Technical Manual* threshold values (based on the peak hour heavy duty diesel truck equivalent emissions ($PM_{2.5}$) screening worksheet referenced in Chapter 17, Section 210 of the *CEQR Technical Manual*, and would occur during an overall construction period of less than two years. Accordingly, no significant air quality construction impacts from mobile sources are anticipated, and a detailed mobile source analysis is not warranted.

In addition, generally, if a transportation analysis is not needed with regard to construction activities, an air quality assessment of construction vehicles is likely not warranted. As demonstrated above under "Transportation," construction of the proposed project does not require a detailed transportation analysis. The action-generated construction, which would be of short-term duration, would not result in increases in peak hour vehicle volumes higher than those identified in the operational condition. Therefore, pursuant to CEQR guidelines, a detailed assessment of construction-related mobile source air quality is not warranted.

Conclusion

Therefore, based on analysis of all of the factors affecting construction emissions, on-site and off-site construction activities due to construction of the project would not result in any significant adverse impact on air quality.

Noise

Impacts on community noise levels during construction under the proposed action could result from noise from construction equipment operation and from construction and delivery vehicles traveling to and from the construction site. Noise and vibration levels at a given location are dependent on the type and number of pieces of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or barriers). Noise levels caused by construction activities vary widely and depend on the phase of construction and the location of the construction relative to receptor locations. The most significant construction noise sources are expected to be the movements of trucks to and from the project area, as well as impact equipment such as excavators with ram hoes, pile rigs, rock drills, tower cranes, and paving breakers.

Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and by EPA. The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, requires the adoption and implementation of a noise mitigation plan for each construction site, limits construction (absent special circumstances as described below) to weekdays between the hours of 7:00 AM and 6:00 PM, and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM, and on weekends) may be authorized in the following circumstances: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. EPA requirements mandate that certain classifications of construction equipment meet specified noise emissions standards.

Construction Noise Impact Criteria

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." This has been interpreted to mean that such impacts would occur only at sensitive receptors where the activity with the potential to create high noise levels (the "intensity") would occur continuously for approximately two years or longer (the "duration"). The *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No Action noise level as the baseline, should be used for assessing construction impacts.

As discussed above, the proposed action would have a duration of 23 months and therefore, per CEQR guidelines, would be short-term and not be considered significant. However, given the proximity of sensitive receptors across the street from the project area, including two schools and a school playground, and the scale of the proposed action, involving the redevelopment of two full blocks, a preliminary analysis of noise effects is provided.

The *CEQR Technical Manual* uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

- If the No Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would be considered a significant increase.
- If the No Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR criteria as being between 10:00 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$.

Noise Analysis Fundamentals

Construction activities induced by the proposed action would be expected to result in increased noise levels as a result of: (1) the operation of construction equipment on-site; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the roadways to and from the project area.

Noise from the operation of construction equipment on-site at a specific receptor location near a construction site is generally calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise level at a receptor site is a function of the following:

- The noise emission level of the equipment;
- A usage factor, which accounts for the percentage of time the equipment is operating at full power;
- The distance between the piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.

Similarly, noise levels due to construction-related traffic are a function of the following:

- The noise emission levels of the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Volume of vehicular traffic on each roadway segment;
- Vehicular speed;
- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

Location of Nearby Sensitive Receptors

The project area blocks contain no existing residential or other noise sensitive uses but the development that would be induced by the proposed action would occur across the street from sensitive receptors including the Beginning With Children Charter School and playground, 11 Bartlett Street, located south of the Southern Block, Bais Ruchel High School, 177 Harrison Avenue, east of the Southern Block, and several residences located east, north, and west of the project area. The distances between the sensitive receptor locations and the closest portion of the project area across the street varies from approximately 70 to 80 feet, i.e., the width of the intervening streets.

Existing weekday daytime noise levels in the area during regular construction hours, as described in Chapter 15, "Noise," range from the mid-60s to low-80s of dBA depending on the specific location and the level of traffic on adjacent roadways.

Noise Reduction Measures

Construction activities resulting from the proposed action would be required to follow the requirements of the New York City Noise Control Code (New York City Noise Code) for construction noise control measures. Specific noise control measures would be described in a noise mitigation plan required under the New York City Noise Code. These measures would include a variety of source and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures would be implemented in accordance with the New York City Noise Code:

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code would be used from the start of construction. Table 18-4 shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for action-generated construction.
- As early in the construction period as logistics will allow, diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welders, water pumps, bench saws, and table saws (i.e., early electrification) to the extent feasible and practicable.
- Where feasible and practicable, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for construction would be implemented to the extent feasible and practicable:

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations. Once building foundations are completed, delivery trucks would operate behind a construction fence, where possible;
- Noise barriers would be utilized to provide shielding (e.g., the construction sites would have a minimum 8-foot barrier and, where logistics allow, truck deliveries would take place behind these barriers once building foundations are completed); and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be used for certain dominant noise equipment to the extent feasible and practical (i.e., asphalt pavers, drill rigs, excavators with ram hoe, and hoists). These barriers are conservatively assumed to offer only a 10 dBA reduction in noise levels for each piece of equipment to which they are applied, as shown in Table 18-4. The details for construction of portable noise barriers, enclosures, tents, etc. are based upon DEP Citywide Construction Noise Mitigation.

Table 18-4, Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	NYCDEP & FTA Typical Noise Level at 50 feet[1]	Mandated Noise Level at 50 feet[2] Under Subchapter 5 of the NYC Noise Control Code	Noise Level with Path Controls at 50 feet[3]
Asphalt Paver	85	85	75
Asphalt Roller	85	74	
Backhoe/Loader	80	77	
Compressors	80	67	
Concrete Pump	82	79	
Concrete Trucks	85	79	
Cranes	85	77	
Cranes (Tower Cranes)	85	85	75
Delivery Trucks	84	79	
Drill Rigs	84	84	74
Dump Trucks	84	79	
Excavator	85	77	
Excavator with Ram Hoe	90	90	80
Fuel Truck	84	79	
Generators	82	68	
Hoist	85	80	70
Impact Wrenches	85	85	75
Jackhammer	85	82	72
Mortar Mixer	80	63	
Pile Driver	101	95	73[4]
Power Trowel	85	85	75
Powder Actuated Device	85	85	75
Pump (Spray On Fire Proof)	82	76	
Pump (Water)	77	76	
Rebar Bender	80	80	
Rivet Buster	85	85	75
Rock Drill	85	85	75
Saw (Chain Saw)	85	75	
Saw (Concrete Saw)	90	85	75
Saw (Masonry Bench)	85	76	
Saw (Circular & Cut off)	76	76	
Saw (Table Saw)	76	76	
Sledge Hammers	85	85	75
Street Cleaner	80	80	
Tractor Trailer	84	79	
Vibratory Plate Compactor	80	80	
Welding Machines	73	73	

Notes:

1 Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006.

2 Mandated noise levels are achieved by using quieter equipment, better engine mufflers, and refinements in fan design and improved hydraulic systems.

3 Path controls include portable noise barriers, enclosures, acoustical panels, and curtains, whichever feasible and practical.

4 Based on information from noise bellow system manufacturer.

Assessment

As discussed above, the analysis looks first at the intensity of noise levels during construction, then assesses the potential duration of those noise levels, and finally makes a determination of the potential for impact.

Intensity of Construction Noise

At sensitive receptor locations nearest where project area construction would occur, existing noise levels, as mentioned previously, would range from approximately the mid-60s of dBA to low-80s of dBA. Such levels would, in some cases, be comparable to the noise levels resulting from construction, which, with the noise control measures described above for the project area, would be approximately in the mid to high 70s of dBA at 50 to 100 feet, and would consequently not create any exceedances of the *CEQR Technical Manual* noise impact criteria. However, construction may result in temporary exceedances of the *CEQR Technical Manual* noise impact criteria for noise intensity during some limited periods of construction when the most noise-intensive construction activities (demolition, excavation, and foundation work) would occur near sensitive receptors. To minimize noise disruption on the Beginning With Children Charter School playground, the Southern Block would have a minimum 12-foot barrier at the southern perimeter of the block facing the playground and, where logistics allow, construction equipment and trucks would be located away from the playground to the extent practicable.

Duration of Construction Noise

As noted above, the duration of construction generated by the proposed action would be less than two years and accordingly considered short-term under CEQR. Furthermore, the most noise intrusive construction activities (demolition, excavation, and foundation work) are expected to take approximately 3 to 5 months per building cluster and have an overall duration of 7 months. Consequently, if an exceedance of the *CEQR Technical Manual* noise impact criteria would occur at some sensitive receptor locations during the noisiest work at the nearest construction site, the exceedance would not be expected to occur continuously for 24 months. While the noise level increases may be perceptible and intrusive, they would not be considered "long-term" or significant according to CEQR criteria.

Construction Noise Impacts

Based on the construction noise preliminary analysis presented above, no significant adverse noise impacts would be expected at any sensitive receptor locations due to construction associated with the proposed action.

Vibration

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibration levels at a receiver are a function of the source strength (which in turn is dependent upon the construction equipment and methods utilized), the distance between the equipment and the receiver, the characteristics of the transmitting medium, and the receiver building construction. Construction equipment operation causes ground vibrations which spread through the ground and decrease in strength with distance. Vehicular traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With the exception of fragile and possibly historically significant structures or buildings, construction activities generally do not reach the levels that can

cause architectural or structural damage, but can achieve levels that may be perceptible and annoying in buildings very close to a construction site. An assessment has been prepared to quantify potential vibration impacts of construction activities on structures and residences near the project site.

Construction Vibration Criteria

For purposes of assessing potential structural or architectural damage, the determination of a significant impact is based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second. For non-fragile buildings, vibration levels below 0.60 inches/second would not be expected to result in any structural or architectural damage.

For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 vibration decibels (VdB) would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time.

Construction Vibration Analysis Results

As discussed in Chapter 7, "Historic and Cultural Resources," there are no historic or cultural resources located adjacent to the project area. Use of construction equipment that would have the most potential to exceed the 65 VdB criterion at sensitive receptor locations (e.g., equipment used during pile driving and rock blasting) would be perceptible and annoying. Therefore, for limited time periods, perceptible vibration levels may be experienced by occupants and visitors to all of the buildings and locations on and immediately adjacent to the project area. However, the operations that would result in these perceptible vibration levels would only occur for finite periods of time at any particular location and, therefore, the resulting vibration levels, while perceptible, would not considered to be significant adverse impacts.

Historic and Cultural Resources

According to the guidelines in the *CEQR Technical Manual*, construction impacts may occur on historic and cultural resources if in-ground disturbances or vibrations associated with project construction could undermine the foundation or structural integrity of nearby resources or if there are potentially archaeologically resources present that could be disturbed by excavation or other in-ground disturbance.

There are no historic or cultural resources located on or in the vicinity of the project area. Furthermore, the NYC Landmarks Preservation Commission has determined that there are no potential archaeological resources in the project area. As such, no construction impacts related to historic and cultural resources are expected and a further preliminary assessment is not needed for the disclosure of potential construction impacts to historic and cultural resources.

Hazardous Materials

According to the guidelines in the *CEQR Technical Manual*, any impacts from in-ground disturbance that are identified in hazardous materials studies should be identified in this chapter as

well. Institutional controls such as (E) designation or restrictive declarations should be disclosed here as well. If the impact identified in hazardous materials studies is fully mitigated or avoided, no further analysis of the effect from construction activities on hazardous materials is needed.

As noted above in the description of construction activities and detailed in Chapter 9, (E) designations would be mapped for all of the tax lots comprising the project area as part of the proposed action. Accordingly, any potential construction-related hazardous materials impact would be avoided. No further assessment of construction effects related to hazardous materials area warranted.

Natural Resources

According to the *CEQR Technical Manual*, natural resources may be affected during construction, particularly during such activities as excavation; grading; site clearance or other vegetation removal; cutting; filling; installation of piles, bulkheads or other waterfront structures; dredging; dewatering; or soil compaction from construction vehicles and equipment. A preliminary construction assessment is not required for natural resources unless the construction activities would disturb a site or be located adjacent to a site containing natural resources.

There are no natural resources on or in the immediate vicinity of the project area. Therefore, no significant adverse construction impacts to natural resources are expected, and a further preliminary assessment is not needed for the disclosure of potential impacts to natural resources.

Summary

As discussed above, construction-related activities resulting from the proposed action are not expected to have any significant adverse impacts related to transportation, air quality, noise, historic or cultural resources, natural resources, or hazardous materials conditions, and a detailed analysis of construction impacts is not warranted.